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**United States Patent** [19][11] **Patent Number:** **5,578,460****Ebersole et al.**[45] **Date of Patent:** **Nov. 26, 1996**

[54] **ELECTROPHORETIC METHOD FOR THE ISOLATION AND SEPARATION OF MICROORGANISMS AND CELL POPULATIONS**

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[51] **Int. Cl.<sup>6</sup>** ..... **C12Q 1/02**; C12Q 1/24;  
C12N 13/00

[52] **U.S. Cl.** ..... **435/29**; 435/30; 435/34;  
435/173.9; 356/344

[58] **Field of Search** ..... 435/29, 30, 34,  
435/173.9; 204/180.1, 299 R, 300 EC,  
153.12; 356/344

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[57] **ABSTRACT**

The present invention sorts microorganism populations from a mixture which contains more than one microorganism population. Microorganisms of different types vary in size, shape, and surface charge characteristics. These characteristics we believe contribute to the rate of migration for microorganisms under the influence of an electric field. Microorganisms of the same population (genus and species) will migrate similarly. By applying an electric field in a direction opposite the direction of fluid flow, separation is enhanced.

**10 Claims, 6 Drawing Sheets**